

ical districts have been: New England, 85.9; Middle States, 86.6; South Atlantic States, 81.9; East Gulf States, 85.0; West Gulf States, 84.7; Lower Lake region, 85.8; Upper Lake region, 82.6; Tennessee and the Ohio valley, 84.5; Upper Mississippi valley, 81.0; Lower Missouri valley, 80.3; Northern Pacific coast region, 85.8; Central Pacific coast region, 95.7; Southern Pacific coast region, 100. Of the 3,720 predictions that have been made, 162, or 4.4 per cent, are considered to have entirely failed; 131, or 3.5 per cent, were one-fourth verified; 484, or 13.0 per cent, were one-half verified; 360, or 9.7 per cent, were three-fourths verified; 2,583, or 69.4 per cent, were fully verified, so far as can be judged from the tri-daily weather maps.

*Cautionary Signals.*—87 Cautionary Signals were displayed during the month, of which 73, or 83.9 per cent., were justified. 13 Cautionary Off-shore Signals were displayed, which were all fully justified both as to direction and velocity. 75 cases of winds of over 25 miles per hour were reported, when signals were not ordered. The above does not include signals ordered at 47 display stations where the velocity is only estimated and not measured.

## NAVIGATION.

In the table, on the right-hand side of chart No. III, are given the highest and lowest readings on the Signal Corps river-gauges for the month, with the dates. The rivers in general remained quite low and falling throughout the month and in no case did the water reach the danger-line. The only important freshets were those following the heavy rains attending storm-area No. IX, in the Red, Arkansas, and Lower Ohio rivers. On the 23rd the water in the Upper Mississippi was so low as to interfere with navigation north of La Crosse.

*High Tides.*—15th, Toledo highest of the season, very near the highest point ever known; 17th, Cape Lookout; 18th, Macon and Portsmouth, N. C., and Cape May and Atlantic City N. J.; 21st, Galveston; 28th, Mayport, Fla.; 31st, Indianola, Texas.

*Low Tides.*—1st to 3rd, Indianola, Texas.

*Tidal Waves.*—18th, at Fisk's Mills, Sonoma county, Cal.; four persons drowned.

## TEMPERATURE OF WATER.

The temperatures of water, as observed in rivers and harbors, with average depth at which the observations were taken, are given on chart No. II. No observations were taken during the month at San Francisco owing to the breakage of the thermometer. At Milwaukee the minimum temperature for the month is omitted as the reports for several days during the month indicated that the thermometer was out of order. The following reports were received too late to be incorporated in the regular table: Punta Rassa maximum temperature at bottom 91°, minimum temperature at bottom 79°, average depth of water 12.3 feet.

## ATMOSPHERIC ELECTRICITY.

*Thunder-storms.*—Thunder storms have been reported in too large numbers during the past month to permit their enumeration in detail. They have been reported on the greatest number of days, in the following states, viz: Iowa 17; Ohio and North Carolina, 14; Illinois, 13; Indiana, Massachusetts and New Jersey, 10; Florida and Nebraska, 9; Summit, Col., (elevation 11,300) reported such storms on 14 days; Pike's Peak on only 3 days. On 5th, 6th, 14th and 22nd they were frequent in the Ohio Valley; on 16th, 17th, 21st and 22nd in the Middle and South Atlantic States; on 22nd and 29th, in New England; on the 10th, 11th and 12th in the Upper Mississippi and Lower Missouri Valleys; on the 14th, thunder-storms generally in New England and at isolated stations in New York, New Jersey, Pennsylvania, Ohio and Indiana. But two such storms have been reported west of the main range of the Rocky Mountains, at Phoenix and Tucson, Arizona.

*Auroras.*—Five auroras have been reported during the month; that of the night of 1st and 2nd was noticed at Burlington, Vt., where it appeared as a well defined dark segment of an emerald green; that of the 6th was seen at New Corydon, Ind., at 9 p. m., at Oregon, Mo., dark to 10 p. m., diffused light, and at Urbana, Ohio, from 6 p. m., as reddish light, becoming white at 9 p. m., and ending at 9:30 p. m.; that of the 9th was observable from Burlington, Vt., on the east to Alpena, Breckenridge and Bismarck on the west. At Breckenridge at 9:55 p. m., bluish colored streamers shot out along the whole length of the lower arch and extended from one to ten degrees along the upper arch; at 10 p. m. only a faint light remained; that of the 7th at Oregon, Mo., from dark to 10 p. m., no streamers; that of the 23rd was observed at Newburyport, Mass., where it was quite faint, and at Gardiner, Me., at which place it was visible from 10 p. m. to midnight; also at Alpena, Mich.

*Atmospheric Electricity Interfering with Telegraphic Communications.*—Pembena, 1st and 24th; Phoenix Ariz., 3rd; in Texas, at Eagle Pass, 3rd, 4th, 7th, 15th and 19th; at Brackettville, 4th and 6th; at Graham and Jacksboro on the 7th; Castroville, 6th, 7th and 15th; Rio Grande City, 8th; Brownsville, 15th; Mason, 17th; Fort Sill, 6th; Santa Fé, 5th, 6th, 9th, 13th, 14th, 16th, 18th; Pike's Peak, 12th, remarkable display; Macon, N. C., 8th.

*Magnetic Variation.*—Prof. F. Hess reports the variation of the magnetic needle on the 9th, about 10 p. m., in the San Juan Valley, Colorado, as "14° 34'."